3: Mariner F-5 (1806-1810) 1818
OU9 Tonga OU9

285 415 [531] [462] of the nut, and have rather the appearance of wicker-work: the latter are sometimes variously stained and ornamented with beads or shells worked in. The larger and coarser baskets are generally made by men, to hold axes and other tools in: also the baskets used to hold victuals, made of the leaves of the cocoa-nut tree, are generally made by men.

285 [338] *Bawlá*, mats for thatching houses, are either made by men or women, but more frequently by the former.

462 565 [285] [436] Most of these mats, baskets, &c. are made by women of some rank as an amusing as well as profitable occupation, exchanging them afterwards for other things: (See p. 95 of this volume). Making of combs, the teeth of which [303] consist of the mid-rib of the cocoa-nut leaf, is also an employment of women of rank. Making 283 [462] [565] thread is an occupation of females of the lower order: it is performed by twisting the separate parts of the thread, in the act of rolling them with the palm of the hand along the thigh, and by a return of the hand, twisting them together the contrary way. The material of the thread is the prepared bark of the *olongá*. 413 Needles are generally made by carpenters out 247 of human thigh bones, which are procured from 727 their enemies slain in battle: the only use they 396 have for them is to make sails.

12: Vason M-3 (1797-1801) 1810
OU9 Tonga OU9

be allowed to pass or repass to excite any alarm. Having placed every thing in a state of preparation, a chosen band proceeded in search of the spot where Dugonagaboola slept. They founed all his attendants asleep, but were afraid to slay any one, lest they should mistake the person of the chief and give the alarm. At length he was betrayed by the perfumeded oil on his head. This oil is scented with wood brought from the Feejee islands, not far distant from Tonga. The wood is rubbed or scraped into a kind of saw-dust, with a rough fish-skin; with this the oil is mixed, and strained, and then it possesses a strong perfume. This is used only by the principal chief. Discovering him by this distinction, they murdered him, and seven or eight of his attendants. This gave the alarm, and the rest fled; but as every road was beset, many of them were killed also. The conspirators then proceeded down to the water, and seizing as many canoes as they needed, broke all the rest, to secure themselves from being pursued during the night.

By the next morning, the alarm was spread through great part of the Island, and multitudes flocked to Mulkaamair with the particular friends of Dugonagaboola, to inquire into the cause of the outrage, and to rouse him to revenge the death of the chief, on Loogolala. The people of Aheefo, which was the particular district of Dugonagaboola, warmly took up the cause of their chief; and hasti-

76: Yuncker N-4,5 (1953) 1959 OU9 Tonga OU9

It is probable that some of the above varieties are incorrectly placed as to subspecies, as it was not possible to determine their exact relationship. So far as I know, no wild species of *Musa* occur in Tonga. Plantains and bananas are grown extensively throughout the group and are an important item in the diet of the Tongans. A comparatively large number of bunches are shipped annually to the New Zealand markets.

137 262 824 [439]

Family Zingiberaceae

Genus **Zingiber** Adanson

Zingiber zerumbet (Linnaeus) J. E. Smith, Exot. Bot. 2: 103, pl. 112, 1804.

Herbaceous plant with pubescent, leafy branches rising to about 1 m. tall from a thickened, fleshy rhizome. Leaves alternate, distichous, entire, oblong-elliptic or lanceolate, acuminate, clasping the stem at the base, up to about 30 cm. long and 5 cm. wide, pubescent beneath. Flowers white or pale yellow, in a large, bracteate, cone-like spike at top of a leafless scape up to about 30 cm. tall, bracts rounded, overlapping, becoming red.

Tongatapu: in a low wet area near Nualei, Mar. 9, 1953, *Yuncker 15221.*

'Eua: in thicket at margin of forest near summit of central part of eastern ridge. Mar. 24, 1953, *Yuncker 15455.*

Vava'u: *Crosby.*

Tafahi: at summit of Piu 'o Tafahi, Dec. 11, 1951, *Hürlimann 459.*

Niuatoputapu: on southward slope of mountain ridge opposite Vaipoa, Dec. 25, 1951, *Hürlimann 636.*

Frequent in thickets throughout the group. An Asiatic species now widely distributed in warm countries.

Tongan name: *angoango.*

The rhizome is used in preparing medicines.

[278] [824]

Genus **Hedychium** Koenig

Hedychium coronarium Koenig, Retz. Observ. Bot. 3: 73, 1783.

Erect herb, stems up to 1 m. tall from a stout rootstock. Leaves distichous, oblong-lanceolate to lanceolate, acuminate, up to 50 cm. more long and 10 cm. wide, petiole short clasping stem with an elongated sheathlike portion. Flowers very fragrant, white turning yellow, perianth tube slender, up to 6 or 8 cm. long, in dense, terminal, bracteate spikes, bracts oblong to obovate or lanceolate, imbricate.

Tongatapu: in moist area along trail below Fatai village, Mar. 10, 1953, *Yuncker 15263.*

'Eua: in Pangai village, Mar. 25, 1953, *Yuncker 15488.*

Common in villages as an ornamental and occasionally as an escape. An Indian species now widelly distributed in warm countries as an ornamental.

[247] [824]

Tongan name: *tevungia.*

The aromatic parts of this plant are used to scent oil.

[303] [824]

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137 **Pipturus argenteus** (Forster f.) Weddell var. ?

Small tree. Leaves elliptic-lanceolate, up to 10 cm. long and 4 cm. wide, green, rugose, slightly pubescent above, very densely white-lanate beneath. Flowers minute, short-pedicellate, in small paniculate, axillary clusters.

Kao: on rocky slope in clearing in forest, May 6, 1953, *Yuncker 15899*.
Tongan name: *tou*.

FAMILY SANTALACEAE

Genus **Santalum** Linnaeus

Identifications of *Santalum* are by Carl Skottsberg.

Santalum yasi Seemann, Bonplandia 9: 258, 1861, *nomen;* Fl. Vit., 210, pl. 55, 1867.

Glabrous shrub or small tree, 4-5 m. or sometimes up to 7 m. tall, young branches slender and often somewhat pendulous. Leaves opposite, lanceolate, acute or acuminate, base acute, up to 8 or 9 cm. long and 2 cm. wide, pinnately nerved, petiole scarcely 1 cm. long, narrowly ridged by decurrent leaf blade. Flowers small, four-parted, at first greenish white, becoming dark red or purplish, short-pedicellate, in axillary, paniculate clusters up to 2 or 3 cm. long; fruit about 1 cm. in diameter and black when mature.

Tongatapu: toward coast near Fatai, Oct. 30, 1951, *Hürlimann 60;* on limestone terrace westward of Fu'amotu, Nov. 3, 1951, *Hürlimann 142;* in beach thicket, Sopu, Feb. 25, 1953, *Yuncker 15016;* in thicket near Niutoua village, Mar. 2, 1953, *Yuncker 15161*.

'Eua: in old clearing back of Pangai village along way to Fuai, Mar. 25, 1953, *Yuncker 15474*.

Nomuka: in thicket along road encircling island between sea and central lake, Apr. 30, 1953, *Yuncker 15853*.

Lifuka: near beach north of Pangai village, Apr. 24, 1953, *Yuncker 15702*.

Vava'u: along trail leading to summit of Talau, west of Neiafu, May 23, 1953, *Yuncker 16142*.

Niuatoputapu: on volcanic soil on mountain ridge above Vaipoa, Dec. 5, 1951, *Hürlimann 350*.

Frequent in thickets throughout Tonga. Also in Fiji.

Tongan name: *ahi*.

[303] [824] The wood is fragrant and is used to perfume oil.

FAMILY OLACACEAE

Genus **Anacolosa** Blume

Anacolosa lutea Gillespie, B. P. Bishop Mus., Bull. 91: 5, fig. 3, 1932.

Small tree, up to 4 or 5 m. tall, branchlets slender. Leaves appearing two-ranked, oblong-elliptic or ovate, obtuse or acutish, base acute, up to 15 cm. long and 5 cm. wide, coriaceous, entire, pinnately nerved, petiole about 5 mm. long. Flowers six-parted, about

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Family MENISPERMACEAE

137

Genus **Stephania** Loureiro

Stephania forsteri (de Candolle) A. Gray, U.S. Expl. Exped., Bot. 1: 36, 1854.

Soft-wooded, twining, glabrous vine. Leaves alternate, round-ovate, bluntly pointed, the base rounded to retuse, peltate, up to 12 cm. or more long and 10 cm. wide, the petiole slender, nearly as long as the blade, attached 2-3 cm. from the margin of the blade. Flowers greenish, dioecious, in compound umbellate clusters; the fruit about 6 mm. in diameter, flattened and slightly laterally concave, red.

Tongatapu: *U.S. Expl. Exped.*

'Eua: in thicket near the center of the island, Mar. 28, 1953, *Yuncker 15544.*

Nomuka: in thicket along the road encircling the island between the sea and the central lake, Apr. 30, 1953, *Yuncker 15823.*

Vava'u: *Harvey; Crosby;* in thicket along the road near Houma village, May 22, 1953, *Yuncker 16115.*

Frequent in thickets throughout Tonga. Malaya to Polynesia.

S. hernandiaefolia Walp. in Hemsley's and Burkill's lists.

Family ANNONACEAE

Genus **Cananga** Hooker f. and Thomson

Cananga odorata (Lamarck) Hooker f. and Thomson, Fl. India 1: 130, 1855.

Tree, up to 15 m. or more tall. Leaves alternate, elliptic-oblong, acute, base rounded, obtuse, entire, up to 20 cm. or more long and 7 cm. wide, pubescent, pinnately nerved, petiole mostly less than 2 cm. long. Flowers greenish yellow, drooping, pubescent, very fragrant, the petals linear-lanceolate, up to 8 cm. or more long, on long, puberulent pedicels, in axillary, pedunculate, umbellate clusters; fruit oblong, fleshy, black, seeds numerous.

Tongatapu: *Graeffe; Moseley;* in Navutoka village, Feb. 27, 1953, *Yuncker 15086;* in Ma'ofanga village, Nov. 23, 1951, *Hürlimann 312.*

'Eua: in Pangai village, Apr. 7, 1953, *Yuncker 15658.*

Vava'u: *Crosby.*

Introduced and cultivated in villages throughout Tonga. A southern Asiatic plant now widely cultivated in tropical countries.

Tongan name: *mohokoi.*

The wood is used for canoe outriggers; the leaves and bark in medicines; and the flowers for ornaments, in leis, and for scenting oil.

[396] [278] [247] [303] [224]

Genus **Polyalthia** Blume

Polyalthia amicorum A. C. Smith, sp. nov. (fig. 9).

Arbor ad 5 m. alta trunco circiter 45 cm. diametro partibus novellis pilis fuscis 0.1-0.3 mm. longis exceptis glabra; ramulis gracilibus apices versus haud 1 mm. diametro teretibus

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copiosissime lenticellatis, hornotinis nigro-purpurascentibus vel brunneis flexuosis demum cineris; petiolis gracilibus canaliculatis 1.5-3 mm. longis; foliorum laminis in sicco papyraceis fusco-viridibus anguste oblong-ellipticis (5-) 7-11.5 cm. longis, 2-3.7 cm. latis, basi inaequilateraliter rotundatis vel subcordatis et in petiolum subito decurrentibus, apice obtusis vel rotundato-cuspidatis, margine integris et paullo incrassatis, obscure pellucido-punctatis, costa utrinque striato-rugulosa supra plana subtus prominente, nervis secundariis utrinsecus 7-9 arcuato-adscenditibus anastomosantibus et rete venularum copioso utrinque manifeste prominulis; inflorescentiis infructescentiisque desideratis. 137

Tongatapu: tree about 5 m. tall, stem about 45 cm. in diameter, near Pikula, June 1, 1953, *Yuncker 16228* (type in U.S. Nat. Herb., nos. 2128585 and 2157731).

Tongan name: *motelolo.*

In spite of the absence of flowers and fruits, the cited specimen can confidently be referred to *Polyalthia,* representing the first Tongan record and an extension of the genus eastward from Fiji. Its closest relative seems to be the Fijian *P. amygdalina* (A. Gray) Gillespie, to which it is strikingly similar in indument of young parts and in leaf shape and leaf texture. However, the new species differs from *P. amygdalina* in the crowded lenticels of its branchlets, in its smaller leaf-blades (those of the Fijian species attaining a size of about 15 × 5 cm.), and in having its leaf-apices obtuse or rounded-cuspidate rather than acute. Another Fijian species suggesting *P. amicorum* in vegetative characters is the Lauan *P. laddiana* A. C. Smith, but that has more sparsely lenticillate branchlets and broader, ovate-elliptic leaf-blades which are acute to acuminate at apex.

Genus **Artabotrys** R. Brown

Artabotrys uncinatus (Lamarck) Merrill, Philippine Jour. Sci. 7C: 234, 1912.

Climbing shrub with spreading, somewhat zigzag branches. Leaves elliptic- or oblong-lanceolate, acuminate, the base acute, somewhat glossy, entire, up to 15 cm. or more long and 4 or 5 cm. wide, the petiole scarcely 1 cm. long. Flowers greenish yellow, fragrant, 2.5 cm. or more long, on stout, hooked, axillary peduncles; the fruit of several, clustered, yellowish, fleshy carpels about 2 cm. long.

Tongatapu: in thicket between Ha'akame village and sea, Mar. 12, 1953, *Yuncker 15283;* in village of Nukunuku, Nov. 18, 1951, *Hürlimann 284.*

Lifuka: in Pangai village, climbing over trellis, Apr. 25, 1953, *Yuncker 15701.*

Vava'u: climbing in thicket near Houma village, May 22, 1953, *Yuncker 16117.*

Rather frequent as a cultivated ornamental, occasionally as an escape. A native of southern China, now widely cultivated in tropical countries. [247] [824]

Tongan name: *mohokoi honolulu.*

The flowers are used to scent oil. [303] [824]

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Small tree. Leaves alternate, elliptic, or elliptic-subobovate, obtuse or subacute, base acute, 6-7 cm. or more long and 3-4 cm. wide, pinnately nerved, finely venulose. Fruit globose, about 1 cm. in diameter, with slightly raised longitudinal ribs, bluntly pointed at apex, base abruptly narrowed to pedicel. 137

Vava'u: *Crosby 241;* mountain trail near Neiafu, Aug. 1926, *Setchell and Parks 15653.*

Perhaps endemic; the Horne Fijian specimens cited by Burkill represent *C. turbinata* Gillespie, a Fijian endemic, and the New Caledonian record mentioned by Burkill needs further consideration.

Tongan name: *motou.*

Cryptocarya hornei Gillespie, B. P. Bishop Mus., Bull. 83: 6, fig. 4, 1931.

Small tree, up to 6 or 8 m. tall, with slender branches. Leaves alternate, somewhat coriaceous, glossy, lanceolate to ovate, acuminate, base acute, three-nerved from near base, entire, petioles scarcely 1 cm. long. Flowers small, in terminal and axillary, paniculate, finely yellow-hairy clusters; fruit globose, with extended apex, glossy, up to 1 cm. in diameter.

'Eua: in open forest near center of island, Mar. 19, 1953, *Yuncker 15357;* margin of forest above Fuai plantation, near center of island, Apr. 5, 1953, *Yuncker 15641.*

This is the first report of this species for Tonga, where it is infrequent; the type is from Fiji.

Tongan name: *motou.*

The bark is used to scent oil.

[303] [824]

Genus Endiandra R. Brown

Endiandra elaeocarpa Gillespie, B. P. Bishop Mus., Bull. 83: 7, fig. 6, 1931.

Tree, up to 25 m. tall. Leaves opposite or alternate, ovate to obovate, apex rounded or bluntly acuminate, base acute, coriaceous, pinnately nerved, entire, petiole up to 1.5 cm. long. Flowers small, in paniculate clusters up to 5 cm. long; fruit green to black, cylindrical, up to 6 cm. long and 2 cm. thick, often curved.

Vava'u: along road above Ha'alaufuli on way to coastal cliff on northeastern side of island, May 21, 1953, *Yuncker 16112.*

This specimen is sterile, but it agrees well with this species in its vegetative characters. If it is correctly identified, this is apparently a new record for it in Tonga. Also found in Fiji and Samoa.

Tongan name: *motou.*

Genus Cassytha Linnaeus

Cassytha filiformis Linnaeus, Sp. Pl., 35, 1753.

Slender, filiform, branching, glabrous, yellow or yellowish green, twining, parasitic plant, attached to host by means of suckerlike haustoria. Leaves reduced to minute scales. Flowers small, greenish white, sessile, in pedunculate, spikelike clusters; fruit fleshy, subglobose, about 5 mm. thick.

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'Eua: border of eastern ridge in central part of island, Nov. 9, 1951, *Hürlimann 206;* in dry, open, grazing area on western slope of eastern ridge, Apr. 6, 1953, *Yuncker 15652;* on sea-facing limestone cliff near summit of eastern ridge, Apr. 8, 1953, *Yuncker 15679.* 137

In Tonga, apparently limited to the eastern ridge on the island of 'Eua. Also known in the Ryukyu and Bonin Islands, the Hawaiian Islands, Pitcairn, and other islands of Polynesia.

Genus **Eriobotrya** Lindley

Eriobotrya japonica (Thunberg) Lindley, Linn. Soc., Trans. **13**: 102, 1821.

Low, evergreen tree, up to about 6 m. tall. Leaves clustered toward ends of stout, pubescent stems, alternate, elliptic, or oval-oblanceolate, sharply acuminate, base cuneate, up to 20 cm. or more long, sharply toothed, glossy above, rusty-woolly beneath, pinnately nerved, petiole short, winged. Flowers white, fragrant, 1-2 cm. wide, in terminal, branching, densely woolly clusters; fruit yellow, globose, downy, edible.

Tongatapu: side of trail near Nualei village, Mar. 9, 1953, *Yuncker 15223.*

Cultivated for its fruit and occasionally as an escape. A native of China now widely cultivated. [245] [824]

Tongan name: *loketi.*

Genus **Parinarium** Aublet

Parinarium glaberrimum Hasskarl, Tijdschr. Nat. Ges. **10**: 147, 1843 [*nomen nudum*]; Flora **27**: 583, 1844.

Small to rather large tree, up to 10 m. or more tall. Leaves alternate, elliptic-oblong or ovate-lanceolate, acute, base rounded, obtuse, up to 20 cm. or more long and 8 cm. wide, entire, somewhat coriaceous, pinnately nerved, midrib with two glands near base. Flowers crowded, in branching, pubescent, axillary, racemose clusters, corolla whitish, anthers yellow, on bluish filaments; fruit large, brown, rough.

Tongatapu: in Nukunuku village, Jan. 11, 1952, *Hürlimann 679;* below Fatai village, Mar. 10, 1953, *Yuncker 15261.*

Vava'u: *Crosby;* along road west of Houma village, May 22, 1953, *Yuncker 16119.*

Tafahi: in grassy area, Tafahi township, Dec. 15, 1951, *Hürlimann 568.*

In villages and occasionally in forested areas. From Java and Borneo eastward to Polynesia.

P. laurinum A. Gray in Burkill's list.

Tongan names: *pipi, pipi failolo.*

The seeds are used to scent oil. [303] [824]

Parinarium insularum A. Gray, U. S. Expl. Exped., Bot. **1**: 488, pl. 54, 1854.

Somewhat twiggy tree up to 12 m. or more tall. Leaves alternate, ovate or lance-ovate, acute to acuminate, the base rounded, obtuse or cordulate, 7-8 cm. long and 3-4 cm. wide,

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The leaves and bark[1] are used in medicines and in scenting coconut oil. For a discussion of this as well as other members of the Rutaceae in Tonga, Fiji, and Samoa, see A. C. Smith (Jour. Arnold Arboretum 32: 226-255, 1951).

137
278
303
113
824

Genus **Acronychia** J. R. and G. Forster

Acronychia niueana St. John, B. P. Bishop Mus., Bull. 178: 67, fig. 3, 1943.

Shrub or small tree, up to 5 m. tall. Leaves opposite, simple, oval, obtuse or retuse, base acute, up to 20 cm. long and 10 cm. wide, minutely glandular-dotted, fragrant, petiole up to 4 cm. long. Flowers very small, white, numerous, in compound, axillary, cymose clusters; fruit subglobose, 5-7 mm. in diameter.

Tongatapu: *Setchell and Parks 15184;* near Fangahina, *Setchell and Parks 15466;* in thicket, near Vaini village, Feb. 26, 1953, *Yuncker 15047.*

Infrequent. Also in Niue.

Tongan name: *ahivao.*

Genus **Micromelum** Blume

Micromelum minutum (Forster f.) Seemann, Viti, 434, 1862.

Small tree up to 4 or 5 m. tall, the branches puberulent. Leaves pinnate, the leaflets up to 12 or more, alternate, ovate-lanceolate, acuminate, the base oblique, up to 10 cm. or more long and 7 cm. wide but mostly smaller, the petiolules about 5 mm. long. Flowers very small, white, fragrant, puberulent, in many-flowered, terminal and axillary, paniculate clusters.

Tongatapu: *Forster; Moseley;* in thicket near Vaini village, Feb. 26, 1953, *Yuncker 15048;* forest, second strand terrace below Fu'amotu, Nov. 3, 1951, *Hürlimann 138, 141.*

'Eua: *Lister;* along road between Ohonua and Pangai, Nov. 8, 1951, *Hürlimann 146.*

Nomuka: in thicket on seaward side of road encircling island between sea and inland lake, Apr. 30, 1953, *Yuncker 15814.*

Lifuka: in seaside thicket north of Pangai village, Apr. 25, 1953, *Yuncker 15748;* in thicket at northern end of island near Lifuka end of the interisland causeway, May 11, 1953, *Yuncker 15983.*

Vava'u: *Crosby;* on forested slope leading down to Lake Anovai, May 19, 1953, *Yuncker 16044.*

Tafahi: fog forest below top of Piu 'o Tafahi, alt. 590 m., Dec. 10, 1951, *Hürlimann 435.*

Frequent throughout Tonga. From southern Asia through Malaya to Polynesia.

M. pubescens Blume var. *glabrescens* Oliv. in Hemsley's and Burkill's lists.

Tongan names: *takafalu, takafalu hina.*

[1] /Evodia hortensis -- Analyst/

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nerved, with numerous fine, anastomosing nervules, petiolules up to 2.5 cm. long, petiole 5-7 cm. or more long. Flowers small, greenish orange, in branching, terminal clusters; fruit ovoid, drupaceous, 2 cm. or more long, seed edible. 137

'Eua: *Lister;* in thinly forested area back of Pangai village, on way to Fuai, Mar. 25, 1953, *Yuncker 15487;* in forest on eastern ridge above Fuai, alt. 150 m., Nov. 9, 1951, *Hürlimann 193.*

Vava'u: *Harvey; Crosby;* in forest at upper rim of coastal cliff along northwest coast, May 25, 1953, *Yuncker 16181.*

Occasional. Also known on Niue Island.

Tongan name: *'ai.*

Canarium samoense Engler, in DC. Monogr. Phanerog. 4: 134, 1883.

Large tree, up to 14 m. or more tall, bark and wood somewhat fragrant. Leaves alternate, pinnate, leaflets elliptic-lanceolate, acuminate, base acute, margin minutely uneven, pinnately nerved.

Kao: on steep rocky slope in open forest, about 180 m. alt., Apr. 30, 1953, *Yuncker 15966.*

This specimen is sterile and the report, which is new for Tonga, should be considered provisional. Also in Samoa.

Tongan name: *makai.*

The timber is used for canoe construction and in general building; the fragrant parts, for scenting oil. [396] [313] [303] [824]

Genus **Garuga** Roxburgh

Garuga floribunda Decaisne, Mus. Hist. Nat. Paris, Nouv. Ann. 3: 477, 1834.

Tree, up to 8 or 10 m. or more tall. Leaves alternate, hairy, pinnate, leaflets elliptic- or ovate-lanceolate, acuminate, base rounded, somewhat inequilaterally oblique, crenate-serrate, up to 13 cm. or more long and 5 cm. wide, pinnately nerved, petiolules scarcely 5 mm. long, petioles up to 8 cm. or more long. Flowers small, numerous, in paniculate clusters up to 15 cm. or more long, inflorescence parts puberulent; fruit 1 cm. or more thick.

Tongatapu: forest margin, below Niutoua village, Mar. 2, 1953, *Yuncker 15114;* near Nuku'alofa, 1926, *Setchell and Parks 15313.*

'Eua: clearing near Ohonua village, Apr. 2, 1953, *Yuncker 15634.*

Lifuka: near dwelling, Pangai village, Apr. 28, 1953, *Yuncker 15794.*

Vava'u: *Crosby 291;* in open forest near eastern coast below Houma village, May 22, 1953, *Yuncker 16129.*

Occasional throughout Tonga. Widespread from the Philippines and Java to Samoa, but not recorded from Fiji. Lam (Jard. Bot. Buitenzorg, Bull. III, 12: 329, 1932) indicates that *G. pacifica* Burkill (Linn. Soc. Bot., Jour. 35: 30, 1901) is to be reduced to the widespread *G. floribunda.*

Tongan name: *manaui.*

The timber is used in general construction work. [313] [824]

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Rather frequent throughout Tonga. Also in Fiji and Niue.

Aglaia sp. in Burkill's list. 137

Tongan name: *langakali.*

The flowers are used for leis and for scenting oil.[1]

For a discussion of the Fijian, Samoan, and Tongan members of the Meliaceae, see A. C. Smith (U.S. Nat. Herb., Contrib. 30: 469-522, 1952). [301] [303] [824] [113]

Family DICHAPETALACEAE

Genus **Dichapetalum** Thouars

Dichapetalum vitiense (Seemann) Engler, in Engler and Prantl, Nat. Pflanzenfam. 3(4): 348, 1897.

High-climbing, woody vine, the young twigs puberulous. Leaves alternate, elliptic-subovate or subobovate, acuminate, base rounded, obtuse or acute, sometimes inequilateral, entire, up to 15 cm. or more long and 7 cm. wide, pinnately nerved, finely venulose as viewed by transmitted light. Flower buds yellow-hairy; fruit obovoid, 1-2 cm. in diameter, densely puberulent.

'Eua: canyon of Lakatoha River near Ohonua, Nov. 10, 1951, *Hürlimann 247.*

Vava'u: in forest near summit of ridge, Mo'ungalafa, May 27, 1953, *Yuncker 16203;* near Neiafu, Aug. 1926, *Setchell and Parks 15654.*

Infrequent. Also in Fiji.

Tongan name: *tuamea.*

Said to be poisonous. [278] [824]

Family EUPHORBIACEAE

Genus **Phyllanthus** Linnaeus

Phyllanthus niruri Linnaeus, Sp. Pl., 981, 1753.

Branching, slender-stemmed, glabrous plant, up to 30 cm. or more tall, subwoody at base. Leaves alternate, along very slender branches, paler beneath, oblong-subspatulate, somewhat oblique, obtuse, base subacute, up to about 1 cm. long and 3 or 4 mm. wide, subsessile on very short petioles. Flowers very small, white, pendent beneath branches on short, slender, axillary pedicels; fruit small, depressed-globose.

Tongatapu: ballast weed, *Setchell and Parks 15329.*

Lifuka: in sandy soil, clearing near beach north of Pangai village, Apr. 25, 1953, *Yuncker 15719.*

Niuatoputapu: in cultivated area above Hihifo toward mountain range, alt. 30 m., Dec. 5, 1951, *Hürlimann 329.*

Occasional. A pantropic weedy plant.

Phyllanthus simplex Retzius, Observ. Bot. 5: 29, 1789.

Slender, glabrous, branching plant, up to 60 cm. tall, slightly woody at base. Leaves numerous, alternate, elliptic-oblong, acutish with a short, mucronate tip, up to about 2 cm.

[1] /Aglaia saltatorum -- Analyst/

76: Yuncker N-4,5 (1953) 1959 OU9 Tonga OU9

137
824
342
313
415
278

Tongan names: *feta'u, tamanu.*[1]

This strong and durable wood is used in house construction and other building purposes, and sections of the trunk are used to make large kava bowls. The oil from the seeds is used medicinally.

Calophyllum vitiense Turrill, Linn. Soc. Bot., Jour. **43**: 17, 1915.

Tree, up to 10 m. or more tall, stems to 35 cm. in diameter. Leaves opposite, oblong-elliptic, obtuse or acute, base acute-decurrent, up to 13 cm. or more long and 5 cm. wide, leathery, glossy, entire, pinnately nerved, midrib prominent, lateral nerves very slender, numerous, parallel, petiole 1-2 cm. long, canaliculate. Flowers about 1.5 cm. wide, in racemose, axillary clusters, corolla pink, stamens numerous; fruit subglobose, 2 cm. or more in diameter, outer flesh pink when young.

'Eua: margin of forest near summit of eastern ridge, Mar. 24, 1953, *Yuncker 15435;* forest near center of island, Mar. 18, 1953, *Yuncker 15326.*

Kao: in forest on steep, rocky slope, May 6, 1953, *Yuncker 15883.*

Occasional. Also in Fiji and the Solomon Islands.

No differences of consequence are apparent among these specimens and the numerous Fijian collections referred to *C. vitiense,* except that the latter have white flowers. This species, not otherwise recorded from Tonga, is probably the one listed by Hemsley (Linn. Soc. Bot., Jour. **30**: 169, 1894) as *C. spectabile* and by Burkill (op. cit. **35**: 27, 1901) as *Calophyllum* sp. (A. C. Smith).

824
313

Tongan name: *tamanu.*

The timber is strong and hard and is used for building purposes.

Genus **Garcinia** Linnaeus

Garcinia myrtifolia A. C. Smith, Jour. Arnold Arboretum **31**: 315, 1950.

Glabrous tree, up to 7 m. or more tall, the trunk up to 25 cm. in diameter. Leaves elliptic or subovate, up to 14 cm. long and 7 cm. wide, obtuse or short-acute, base rounded, abruptly acute-decurrent, subcoriaceous, pinnately nerved, midrib prominent, lateral nerves numerous, very slender, petiole stout, canaliculate, about 1 cm. long. Flowers mostly solitary, on axillary pedicels about 1 cm. long; fruit ellipsoidal, about 2 cm. in diameter, with an apical crownlike thickening.

'Eua: edge of forest near center of island, Mar. 20, 1953, *Yuncker 15381.*

Kao: in forest on steep, rocky slope, May 6, 1953, *Yuncker 15908, 15955.*

Occasional.

These interesting specimens are clearly referable to the supposed Fijian endemic, of which at least three other Fijian collections have been noted since its description (A. C. Smith).

824
303

Tongan name: *feto'omaka.*

The bark is used for scenting oil.

Garcinia pseudoguttifera Seemann, Fl. Vit., 40, 1865.

Tree, up to 6 m. or more tall. Leaves opposite, obovate, apex rounded, emarginate, base acute-decurrent, up to 7 cm. or more long and 5 cm. wide, coriaceous, pinnately

1 /Calophyllum inophyllum -- Analyst/

76: Yuncker N-4,5 (1953) 1959 OU9 Tonga OU9

Nomuka: margin of thicket along road encircling island between sea and inland lake, Apr. 30, 1953, *Yuncker 15816.* 137

Lifuka: roadside ditch between Pangai village and southern end of island, Apr. 28, 1953, *Yuncker 15780.*

Vava'u: along road between Mataika and Feletoa, northwest of Neiafu, May 20, 1953, *Yuncker 16053.*

Occasional as a plantation and waste-area weed throughout Tonga. A tropical American plant now widespread in warm countries.

Tongan name: *te'ekosi totolo.*

Salvia coccinea Jussieu, Murray, Soc. Reg. Sci. Gott. Comm. 1: 86, 1778.

Freely branching, hairy herb, up to about 60 cm. tall. Leaves ovate, acute or obtuse, base truncate or subcordate, up to 5 cm. or more long, crenate-serrate, petioles rather slender. Flowers bright red or pink, corolla puberulent, about twice as long as calyx.

Vava'u: *Crosby.*

A tropical American species rather widespread as a weed in waste areas.

S. pseudo-coccinea Jacq. in Burkill's list.

Tongan name: *te'ekosi.*

Genus Coleus Loureiro

Coleus amboinicus Loureiro, Fl. Cochinchinensis, 372, 1790.

Low, densely pubescent, aromatic herb. Leaves opposite, ovate, acute or obtusish, base cuneate, up to 12 cm. or more long and 9 cm. wide, coarsely toothed, finely pubescent on both sides, petiole up to 5 cm. or more long. Flowers pale lavender, on short, slender pedicels, in whorls in a terminal, interrupted, racemose cluster.

Tongatapu: garden, Nuku'alofa, 1926, *Setchell and Parks 15414;* in border of plantation near Nualei village, Mar. 9, 1953, *Yuncker 15232.*

Nomuka: sandy soil near sea below village, Apr. 30, 1953, *Yuncker 15861.*

Lifuka: roadside north of Pangai village, May 10, 1953, *Yuncker 15797.*

Frequent as a waste-area and roadside weed throughout Tonga. From India and Malaya to Polynesia.

Tongan names: *pasiole, kaloni.*

The plants are extremely aromatic. The leaves are added to the water for washing clothes to perfume them and are used for scenting oil. [824] [296] [303]

Coleus blumei Bentham, Labiat. Gen. and Sp., 56, 1832.

Erect, tender, square-stemmed, brown-pubescent herb, up to about 1 m. tall. Leaves opposite, ovate, crenate, up to 15 cm. long, acute, often dark red above, red and green beneath, petioles long and slender. Flowers light blue, subsessile, in whorls on an elongated terminal spike.

Frequent as an ornamental about dwellings, in cemeteries, and so forth. Occasional specimens were noted as escapes along roadsides. An East Indian species now of worldwide cultivation. [824] [245] [351] [764]

76: Yuncker N-4,5 (1953) 1959 OU9 Tonga OU9

Genus **Gardenia** Ellis

Gardenia jasminoides Ellis, Roy. Soc. Philos., Trans. 51(2): 935, 1761. 137

Shrub, 1-2 m. or more tall. Leaves opposite, elliptic-obovate, bluntly short-pointed, base cuneate, up to 5 cm. or more long and 2.5 cm. wide, somewhat glossy, petiole very short, winged by decurrent blade margins. Flowers large, fragrant, solitary in the leaf axils, calyx angled or winged, corolla white, turning yellowish, tube about 5 cm. long; fruit ovoid, many-seeded.

Tongatapu: near dwelling in Fatai village, Mar. 10, 1953, *Yuncker 15257.*

Occasional as an ornamental shrub. A native of China now widely cultivated.

Tongan name: *siale matalateau.*

The flowers are used in leis. [824] [301]

Gardenia taitensis de Candolle, in DC. Prodr. 4: 380, 1830.

Large shrub or small tree up to 4 m. or more tall. Leaves opposite, elliptic-obovate, obtusely short-pointed, base acute to cuneate, up to 13 cm. long and 7 cm. wide, pinnately nerved, petiole very short, winged by decurrent blade margins. Flowers white, very fragrant, corolla lobes about 4 cm. long, spreading, equaling tube, solitary, axillary; fruit globose, about 2.5 cm. in diameter, longitudinally ridged.

Tongatapu: *Forster; Graeffe;* in thicket along trail between village of Ha'akame and sea, Mar. 12, 1953, *Yuncker 15281.*

'Eua: *Lister;* in Pangai village, Mar. 25, 1953, *Yuncker 15480.*

Rather frequent in villages and occasionally in thickets. Polynesia and Fiji.

Tongan name: *siale tonga.*

The flowers are used for leis, the scenting of oil, and so on. [824] [301] [303]

Genus **Canthium** Lamarck

Canthium barbatum (Forster f.) Seemann, Fl. Vit., 132, figs. 2, 3, 1866.

Glabrous shrub or small tree, up to 5 m. tall. Leaves opposite, oval, oblong-oval-ovate, or oval-subobovate, abruptly short-acuminate, base acute, decurrent, up to 15 cm. long and 9 cm. wide, but mostly smaller, pinnately nerved, petiole scarcely up to 1 cm. long. Flowers about 8 mm. long, corolla tube narrow, limb spreading to about 5 mm. in width, white turning yellow, on pedicels 1-1.5 cm. long, in few-flowered, umbel-like or paniculate clusters on axillary, peduncle-like stalks about 2 mm. or more long; fruit obcordate, compressed, about 1 cm. long and as wide, red.

Tongatapu: *Forster;* in thicket near Vaini village, Feb. 26, 1953, *Yuncker 15045;* in forest near Niutoua village, Mar. 2, 1953, *Yuncker 15128;* in seaside thicket, Blow Hole area near Houma village, June 1, 1953, *Yuncker 16221;* in seaside thicket below Haveluliku village, June 3, 1953, *Yuncker 16232.*

'Eua: *Lister;* seaward margin of ridge forest above village of Houma, Mar. 26, 1953, *Yuncker 15492;* in seaward margin of forest on terrace on northwestern side of island, Mar. 26, 1953, *Yuncker 15504.*

Nomuka: in thicket near shore of central lake, Apr. 30, 1953, *Yuncker 15843.*

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'Eua: *Lister.*

Lifuka: in seaside thicket north of Pangai village, Apr. 25, 1953, *Yuncker 15747;* in seaside thicket near southern end of island, Apr. 28, 1953, *Yuncker 15790.* 137

Kao: on lower rocky slope in clearing, May 6, 1953, *Yuncker 15878.*

Vava'u: *Crosby; Harvey.*

Niuafo'ou: near shore of central crater lake, May 16, 1953, *Yuncker 16011.*

Common near the shore throughout Tonga. An Indo-Malaysian strand species extending into Polynesia.

Tongan name: *puopua.*

The wood is used for general construction work, banana shooks, and so forth; the bark, in preparing medicines; and the flowers, to perfume oils. [824] [313] [278] [303]

Genus **Timonius** de Candolle

Timonius polygamus (Forster f.) Robinson, Am. Acad. Arts Sci., Proc. 45: 394, 1910.

Shrub, about 2 m. or more tall. Leaves opposite, obovate, apex rounded, obtuse or slightly pointed, base acute or obtusish, rather thick, glossy above, up to 10 cm. or more long and 5 cm. wide, pinnately nerved, petiole scarcely 5 mm. long. Flowers white, pubescent, solitary or several in cymose clusters on rather long, axillary peduncles; fruit subglobose, about 1 cm. long, crowned with calyx.

Vava'u: *Crosby;* along upper edge of limestone coastal cliff above Leimatua, May 25, 1953, *Yuncker 16075.*

Occasional. Eastern Fiji to the Tuamotus and Henderson Island.

T. forsteri DC. in Burkill's list.

Genus **Coffea** Linnaeus

Coffea arabica Linnaeus, Sp. Pl., 172, 1753.

Shrub or small tree, about 2-3 m. tall. Leaves opposite, oblong-elliptic to subobovate, glossy, acuminate, base acute, glabrous, pinnately nerved, petiole about 1 cm. long. Flowers white, fragrant, short-pedicellate, in axillary clusters; fruit ovoid, red, two-seeded.

Tongatapu: in plantation below Nualei village, Mar. 9, 1953, *Yuncker 15226.*

Occasional in villages or plantations. A tropical African species now widely grown in tropical countries.

Tongan name: *kofi.*

Genus **Ixora** Linnaeus

Ixora calcicola A. C. Smith, sp. nov. (fig. 13).

Frutex ad 1.5 m. altus, ramulis glabris teretibus rugulosis cinereis apices versus circiter 2 mm. diametro; stipulis liberis glabris circiter 4 mm. longis e basi late ovato in aristam rigidam ad 2 mm. longam angustatis, pilis supra cicatricibus castaneis circiter 1 mm. longis; foliis glabris, petiolis semiteretibus rugulosis 3-6 mm. longis, laminis papyraceis

1 /Guettarda speciosa -- An lyst/

/45 cont./

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[113]

statement of Meinicke (C.E. Meinicke, Die Inseln des Stillen Ozeans /The islands of the Pacific/, part II. Leipzig 1876. p. 75) is correct, there was a common beard style in Tonga in the second half of the 19th century, probably in imitation of the European example.

As a result of the presence of American troops on the main island, the short moustache became popular among many younger, eagerly imitative Tongans, but now it gradually seems to be "going out of fashion."

Although European perfumes and scented skin creams are today available on almost all islands of the Archipelago, and younger Tongan women in particular like to buy them, the ancient Tongan fragrant oil (lolo Tonga) is still laboriously prepared in all villages and is extensively used by almost all natives of both sexes. This Tongan oil has been able to maintain its place (103)

103. Cf. J. Cood, Beschreibung...loc. cit. VI. p. 281; W. Ellis, An authentic narrative /cited in English/ loc. cit. II. p. 93; J. Martin, An account.../cited in English/. loc. cit. II p. 346; S.S. Farmer, Tonga... loc. cit. p. 143.

thus well because, aside from the work involved, it costs nothing compared with the relatively expensive European products, and secondly, because Tongan noses are probably much too accustomed to the typical scent of the lolo Tonga which pervades the atmosphere of humans and dwellings. Nobles and commoners alike use it, and it may be assumed that production and use have even increased compared with the past. (104)

[565]

104. Cf. J. Cook, loc. cit. p. 281.

303 /46/ We give here the process of production of Tongan oil:

The inner part of the tui tui (fruit of Aleurites moluccana [L.] Willd.) and the (fragrant) leaves (or blossoms) of the shrubs moengalo (Melastoma denticulatum), nukonuka (Decaspermum fruticosum),

/46 cont./

303 sinamoni (Cinnamomum--?) and pasiole (Pogostemon nepetoides) are pounded between two stones and mixes with oil (made from pressed, grated coconut meat). This intermediate product is then kept for a night in a bowl in the house and the next day it is placed in the sun. The substance is kneaded and pressed over a metal sheet and the now fragrant oil runs from the slightly tilted metal sheet into an enamel bowl placed to receive it. Plant remnants carried along are afterwards fished out of the oil in the bowl with a piece of tapa. Then the bowl is left standing in the sun so that the water still present in the oil can evaporate; finally the lolo Tonga is poured into glass bottles which are closed with tapa stoppers. The oil is [462] now ready for use. Production is entirely women's work.

303 415 177 This lolo Tonga and its method of production are basically an ancient Tongan cultural asset. The European elements such as glass bottle, enamel bowl and sheet metal are convenient substitutes for Tongan mechanical aids that were once laboriously produced (for [139] instance, calabashes). The natives also like to use the leaves of various plants imported by Europeans; the last two aforementioned shrubs, for instance, are not indigenous to Tonga.

303 184 The recipe mentioned above was obtained on Nomuka. Though the procedure remains the same, the ingredients of fragrant leaves, blossoms, fruits and roots vary, and most women probably have their own "secret recipe." Thus one woman in Pangai/Lifuka uses, besides coconut oil and the Aleurites fruit, langakali blossoms (Aglaia samoensis), mohokoi blossoms (Cananga odorata [Lam.] Hook f. and Thomson), heilala fruit, pipi fruit and pako roots, while another in the same village adds to these ingredients siale (Gardenia taitensis D.C.), tevunga, pasiole, sipaisi and kilimau. (105)

[643] 105. In the past, great chiefs also liked to use an oil that was enriched with sandelwood

303 /46 cont./
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[643]

instead of the blossoms and leaves mentioned (cf. J. Martin, loc. cit. p. 346.

302 The lolo Tonga is used day after day by men, women and children for the body and for the hair (especially after washing). There are few Tongans who reject the native oil because it "soils" the clothing (white shirts, for instance). Undoubtedly this oil has a beneficial effect on the skin, and it helps the natives very much to keep their thick. mostly curly or wavy hair in order.

Hair Style

[177] Hair styles have changed as a result of European influences. Only a few aged men in the Archipelago wear the hair style that is commonly regarded as that of ancient Tonga: their hair is cut short at the sides, but not on top where it is combed back. The male population today wears a truly short haircut that can be /47/ arranged in two principal ways. In one case, they cut the hair short at the temples and at the back of the head, and take away enough of the top length so that when the hair is combed back it is loose (that is, wavy or curly). This hair style is worn by the younger natives, in their twenties or thirties. In the second instance, they cut the hair short at the temples and the back of the head, and cut the top part rather short, so that when it is combed back it makes a sort of "crew cut." This haircut worn chiefly by older men is said by [177] various Tongans to have been copied some time ago from ("civilized") natives of Niue. (106)

106. However, even G. Forster already mentions, for 'Eua, short-cut hair that stands up "like bristles" (G. Forster, loc. cit. IV. p. 325).

[565] Other ancient hair styles, as for example malu malu, the hair hanging
[184] down over the forehead, a style worn by renowned warriors, (107)

/162 cont./

245 huo spade they dig holes approximately 50 centimeters deep (diameter 25 to 30 centimeters) in which they plant a sprig (root sucker). They fill the plant hole with earth so that a depression remains in which water from rainfalls can accumulate. The distance between plants is about five meters on a flat area. Every three weeks or so they remove the proliferating weeds with the huo lafa-lafa. After six to nine months the first fruits can be harvested.

niu = Coconut Palm (Cocos nucifera L.)

824 178 Since the settlement of the Archipelago the coconut palm has played a very special role in Tongan culture. At the present time in particular, in view of its extraordinarily manifold uses, (426)

426. The following list will show the all-purpose uses of the coconut palm in Tonga; ("old") and ("new") indicate whether or not its utilization was already common in ancient Tonga.

[262] [252] [231] [303] [372] 1. The meat of the nut (kakano 'i niu): eaten in pieces by the natives (old); grated (or squeezed out as coconut milk) for preparing foods and beverages (old); grated to feed chickens and pigs (old), used in pieces to feed pigs (old) and horses (new); used for making copra (new); the oil obtained from the meat is used to make hair oil and body oil (lolo Tonga) (old), to fry in a pan (new) and to burn as fuel in the absence of petroleum imports (old).

[272] [262] [264] 2. The water of the nut (huhu'a oe niu): especially of unripe nuts is drunk by the natives (old); in an unripe nut it is stirred together with the meat and eaten (old); used at meals to wash one's fingers (old).

[415] [372] [524] 3. The hard shell (Endocarpium) of the nut (nge'esi niu): used for making drinking mugs (old); as fuel (old) and (as charcoal) to heat flat irons (new); used as a child's toy su nge'esi niu ("coconut shell shoes," see p. 272 (new).

[283] 4. The husk (Mesocarpium) of the nut (pulu): used to make cord (kafa) for house and boat building, for fastening blades to tools etc. (old); used as cover for hatchets